An Information Communications Technology Architecture for Austere Environments

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Military operations span the whole spectrum of combat, SARO, and disaster

Agenda

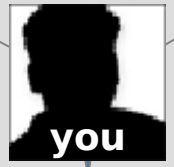
- Information communication technology (ICT) requirements to support…
  - Stability and reconstruction operations (SARO)
  - Emergent problems with increasing complexity
- DoD Response:
  - STRONG ANGEL demonstration series
  - Lessons learned from deployments, including UNIFIED ASSISTANCE

No one tool fits all situations.

STRONG ANGEL II: 17-22 July, Kona, Hawaii

http://strongangel.telascience.org

forward staff



personal resources

external resources

Problem Set

- multi-organizational: international, civ+mil
- full spectrum: combat ops → SASO→ autonomy
- austere environment

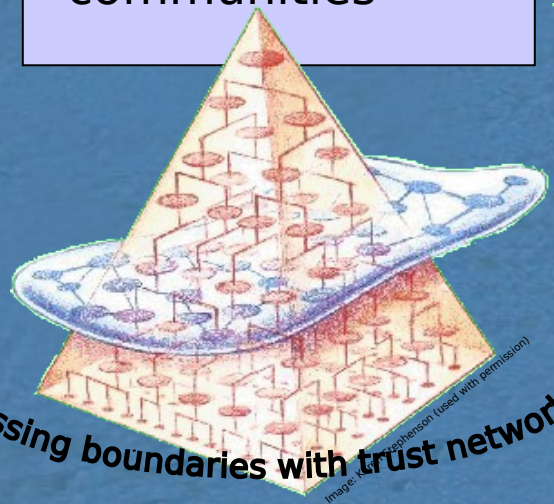
connecting a mesh of players, globally

Tasks

- Translation
- Collaboration
- Communications
- Assessments
- Open Source
- Habitation
- Implementation
- Community

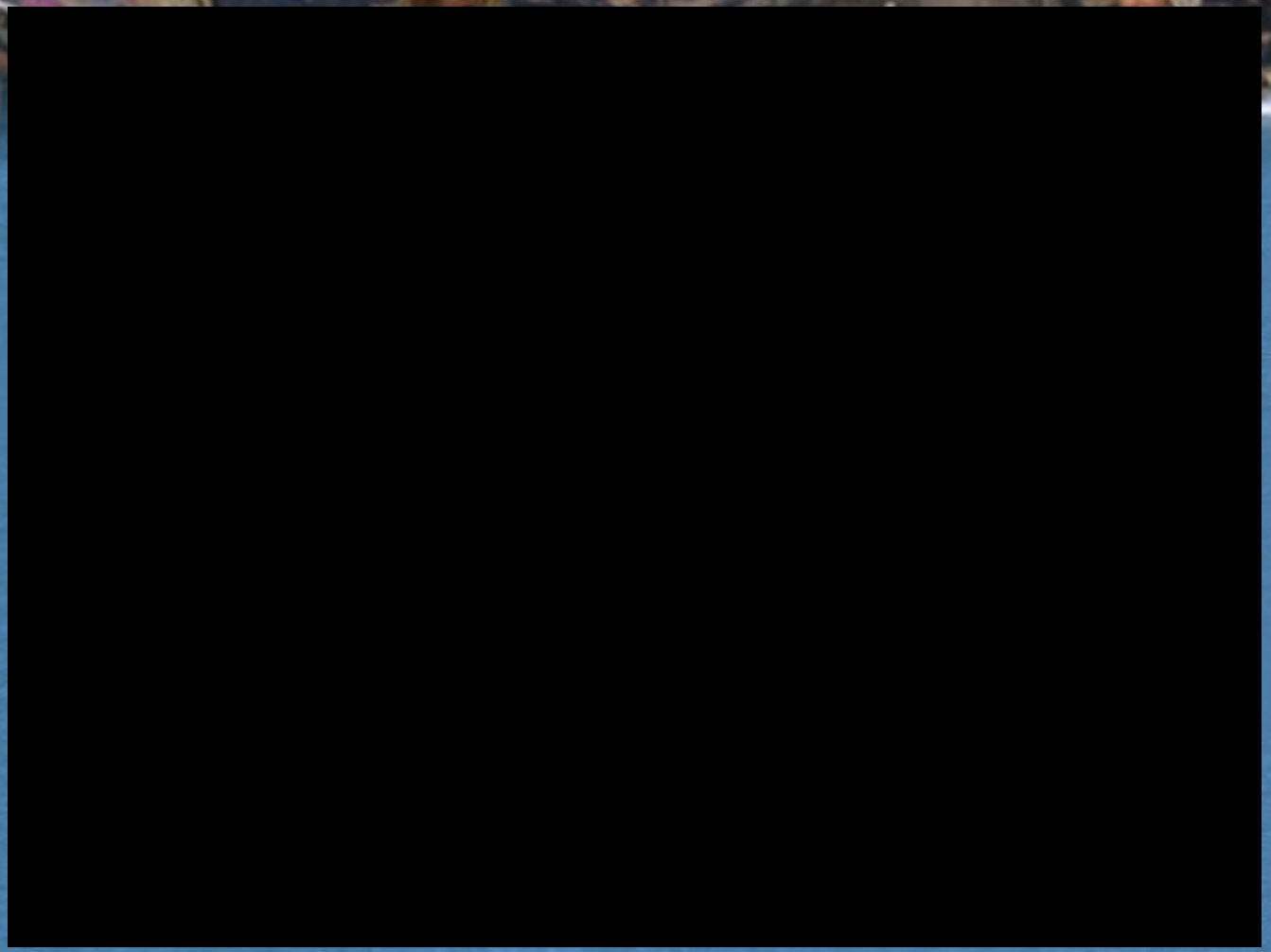
Objectives

- civil-military synchronization
- leave-behind tools & capabilities
- sustainable communities

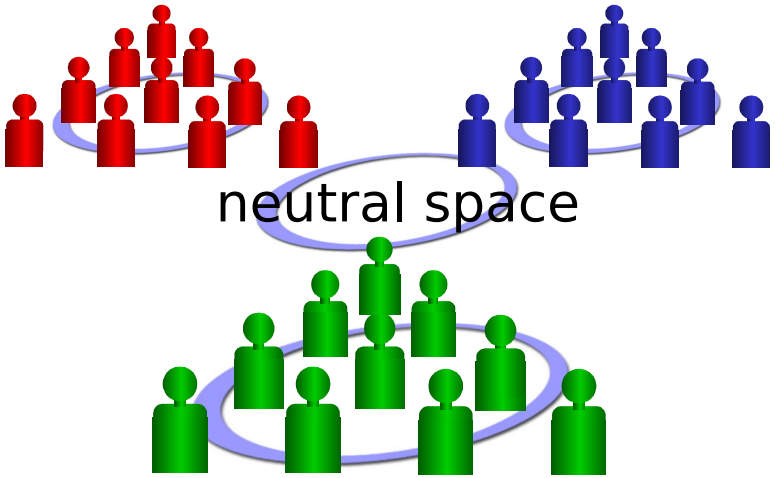


crossing boundaries with trust networks

Groove in STRONG ANGEL II



Neutral Infrastructure for Sri Lankan Peace Process



- People work together in neutral space held together by mutual trust.
- Applies to: Joint, Coalition, Inter-agency, Civil-military, International

Showstoppers

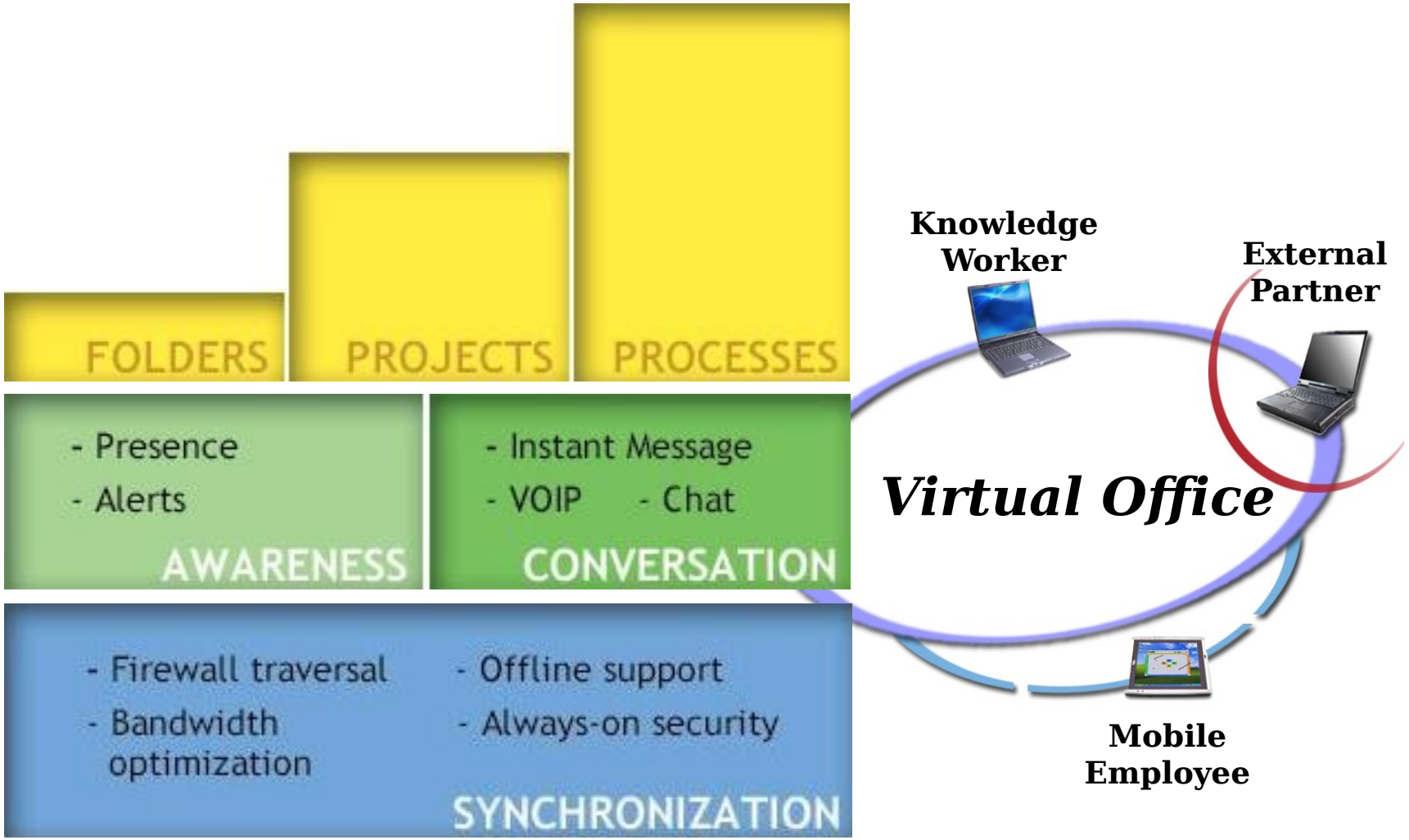
Information technology offers an opportunity to overcome traditional barriers to achieve mutual interest, but it its application is often stymied by:

- No support for austere conditions
- Lack of security
- Lack of transparency
- Lack of neutrality
- Lack of substitution
- Lack of scalability
- No “additions on the fly”
- No sustainability

Other Inhibitors

- technological immaturity
- comparative education & training
- cultural & regional differences

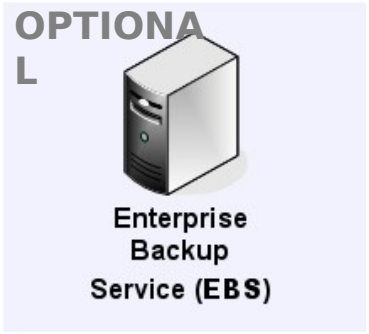
Groove Core Capabilities



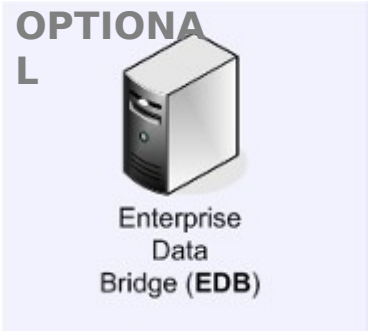
Groove Systems Components

1) Acct Mgmt
2) Policy Mgmt
3) Usage Rpts

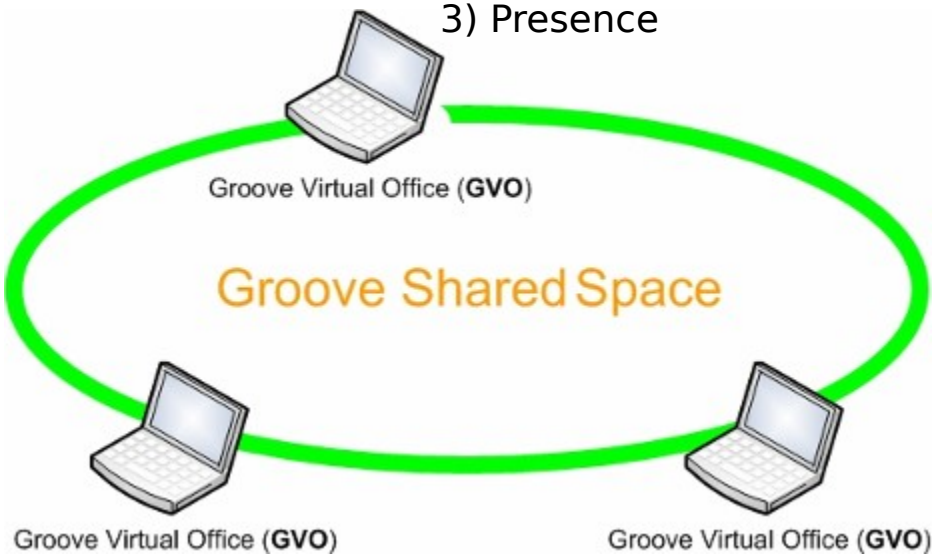
1) Firewall Traversal
2) Message Queue
3) Presence



1) Always on
2) Highly Available
3) Space Backup



1) Extend Applications
2) Multi-Platform Support
3) "Work-Share-Store"



1) Local Data Store
2) Local Message Queue
3) Local Web Services

The Austere & Disrupted Edge of the Network

At the edge of the network, assume that there will be...

...low/no bandwidth

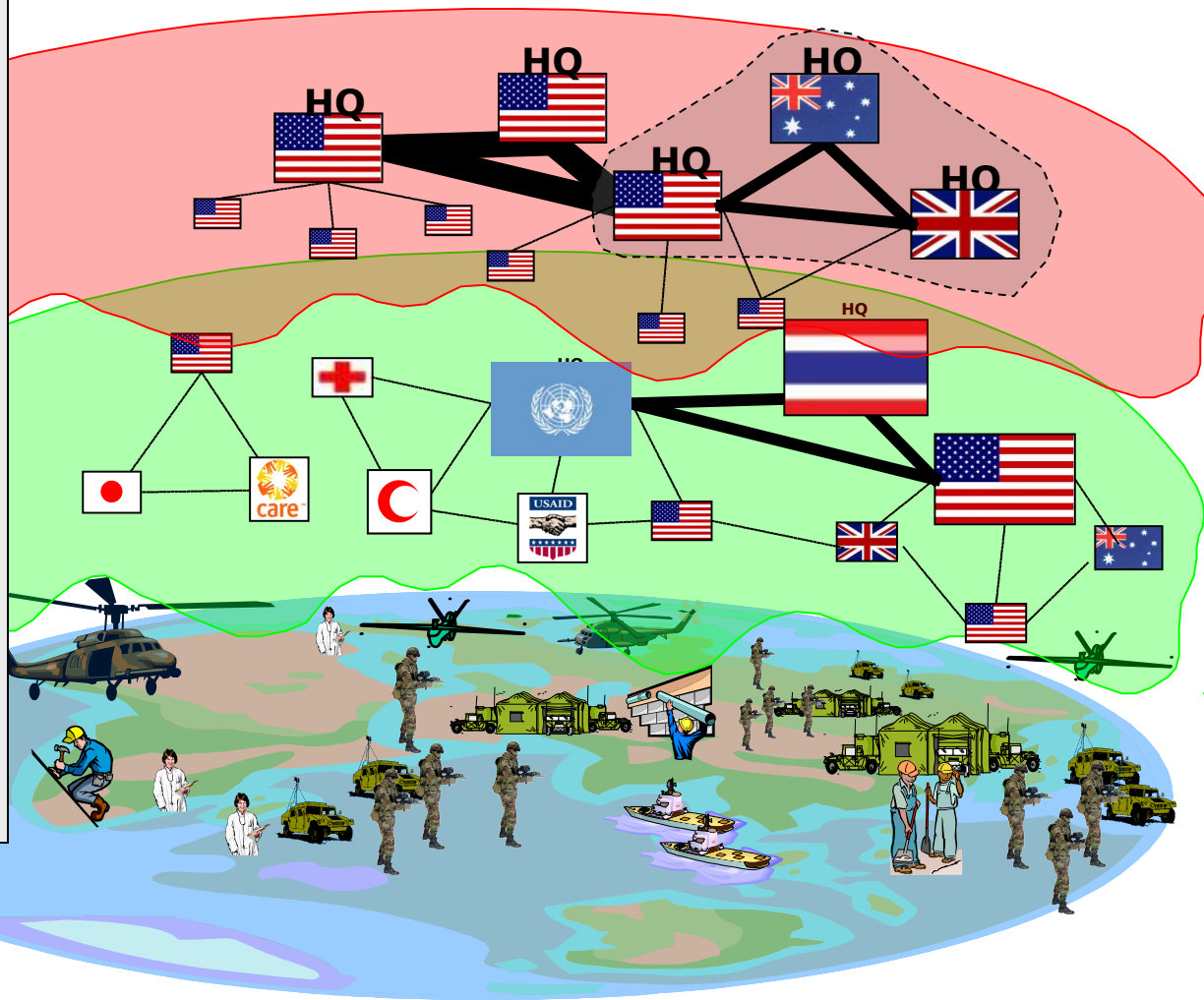
...intermittent comms

...no common CA

...no network security

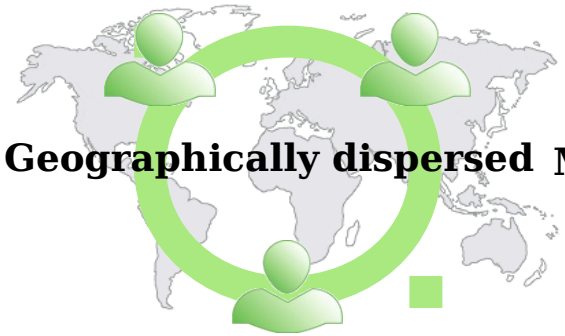
...firewalls (one port open)

...many organizations with diverse requirements



Barriers to Achieving Objectives

Complexity is increasing:



Geographically dispersed

Mobile Field Operations

Multi-organizational

On an austere network

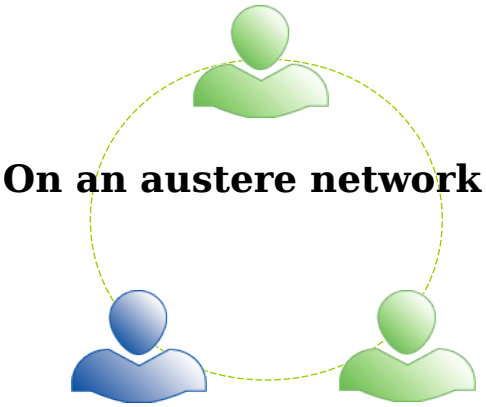
Operational Complexity

Organizational Complexity

Environmental Complexity

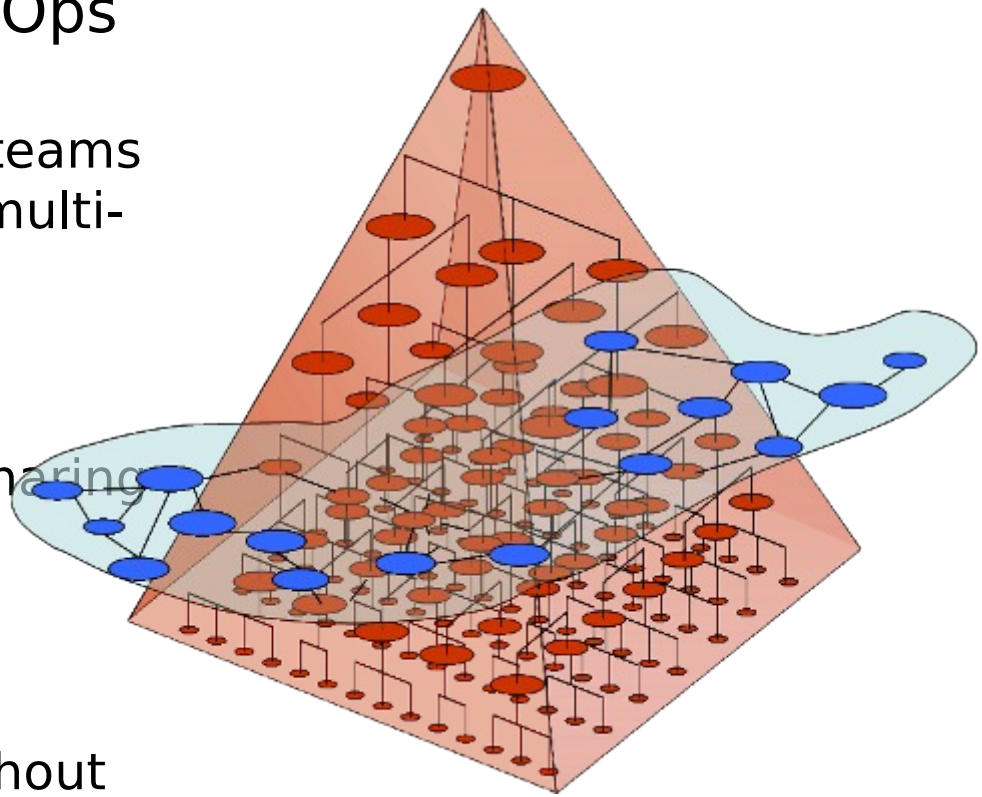
Situations that Require Groove

- **Austere Environments**
  - Low/No Bandwidth
  - Poor network quality / Intermittent connectivity
  - whether in AF, IZ or in the Pentagon, when the network goes down
- **Field Ops / Tenancy**
  - Users don't own the network infrastructure they are using,
  - Working TDY or offsite, Attached/tenant unit
  - Extended periods of disconnected or locally-connected use



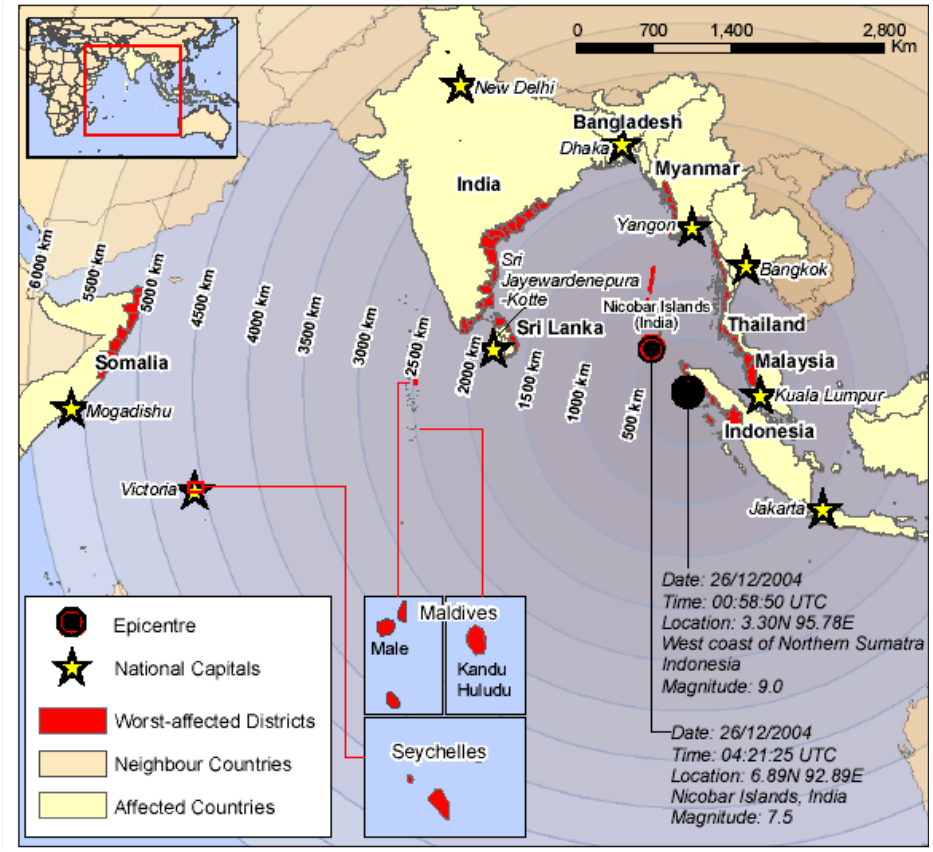
Situations that Require Groove

- Multi-Organizational Ops
  - The Boundryless Organization: Virtual teams (multinational, joint, multi-discipline)
  - No common PKI cert. authority
  - Limited information sharing agreements
- Contingencies
  - Anything unplanned
  - Rapidly organized without the guideposts of SOP



Military forces support the whole spectrum of SARO, post-conflict, and

OPERATION UNIFIED ASSISTANCE



“Task Force Rasmussen” Assessing Collaboration Effectiveness

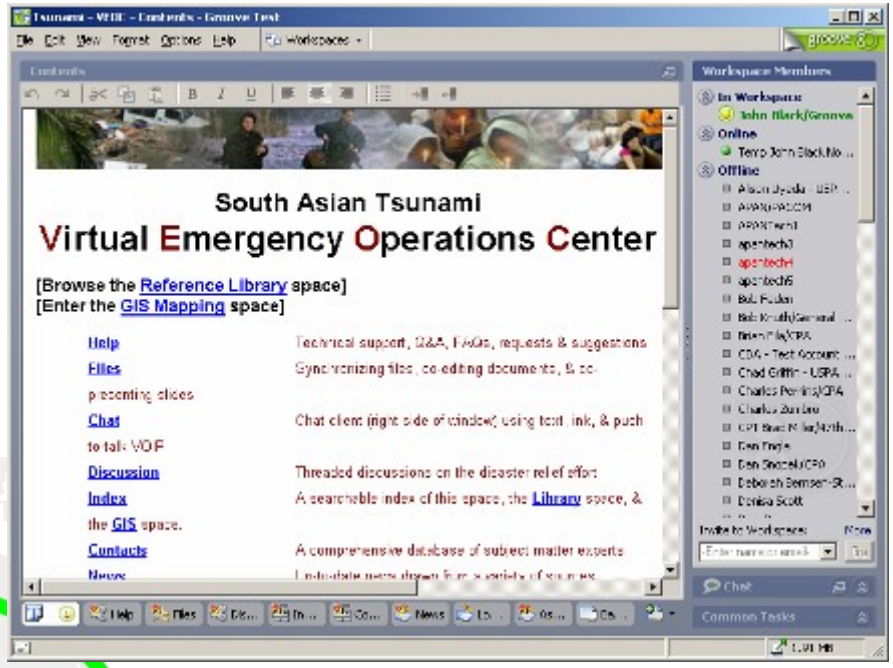
Mission: Identify, document, and address constructively issues impeding optimal work at the civil-military boundary

(OSD-NII / OPNAV-N71

- Imagery, GIS & Meteorology
- Transportation Management
- Hydrography, Civil Engineering & Survey
- Epidemiology & Medical Informatics
- Communications
- Logistics

Civ-Mil Coordination Conducted in Groove, in and Beyond the Relief AO

- **Dynamic mix of participants**
- **Fragile trust**
- **No organic comms**
- **No central hierarchy**
- **Continuous, asynchronous change**



Tsunami - VEOC - Contents - Groove

File Edit View Format Options Help | Workspaces

Contents

South Asian Tsunami
Virtual Emergency Operations Center

[Browse the Reference Library space]
[Enter the GIS Mapping space]

Help	Technical support, Q&A, FAQs, requests & suggestions
Files	Synchronizing files, co-editing documents, & co-presenting slides
Chat	Chat client (right side of window) using text, ink, & push-to-talk VOIP
Discussion	Threaded discussions on the disaster relief effort
Index	A searchable index of this space, the Library space, & the GIS space.
Contacts	A comprehensive database of subject matter experts
News	Up-to-date news drawn from a variety of sources
SITREPS & Updates	SITREPS & updates selected by a distributed team
News Feeds	Online news aggregators updated hourly
i. Indonesia	Automated news feed on relief efforts in Indonesia
ii. Sri Lanka	Automated news feed on relief efforts in Sri Lanka
iii. India	Automated news feed on relief efforts in India
iv. Thailand	Automated news feed on relief efforts in Thailand
v. Disease	Automated news feed monitoring tsunami-related outbreaks
Web Links	Co-browsing of shared links to web-based resources
Logistics	Suite of applications for managing relief operations

Workspace Members

In Workspace
- John Black/Groove

Online
- Alison Uyeda/PACOM
- Allan Tagayuna/PACOM
- Andy Swarbrick
- Anne Sylvester/PACOM
- APAN/PACOM
- apantech4
- apantech5
- Avis Webster
- Beth Houghton/Groove
- Blair Craig/PACOM
- Bob Feden
- bob jones
- Bob Knuth/General D...
- Brian Fila/CPA
- Carsten - CEG
- Chad Griffin/PACOM
- Charles Perkins/CPA

Offline
- CPT Brad Miller/47th ...
- Dayton Maxwell - ho...
- Deborah Bernsen-Str...
- Delete Michael Helfric...
- Denisa Scott
- Lin Wells/Strong Angel

Invite to Workspace: More
-Enter name or email- Go

Chat

Common Tasks
- Turn Off Tool's Unread Alerts
- Add Tools
- View Workspace Properties
- Invite My Other Computers

C... 1 | Help | Files | Discuss... | Index | Contacts | News | Logistics | Assess... | Backup

2.88 MB

Tsunami After Action Report - Early Input

“Things may now be at the phase where tools that have been tested in austere environments become formally recognized as a standard package, endorsed by whatever agencies need to make it stick within and beyond the US borders.”

“Groove—Great, essential tool for us disaster managers to collaborate, communicate and coordinate…BUT not everyone (and more importantly, not every organization) has it.”

Tsunami After Action Report - Early Input (Cont'd.)

"There were some bad experiences [from lack of] discipline, no download on demand, lots of posting of big files…That said, Groove is still an exquisite tool and will continue to be effective for those of us who use it."

"Groove is not easy to deploy in the middle of an emergency… and it is most valuable if all of the key players have it. The answer is to promote adoption during the calm periods, in order to be ready next time."

"The system to get approval for putting software on government systems is too cumbersome. [If] my organization cannot institute emerging technology, techniques, or innovations on the fly then we will always be behind whatever comes (disaster response, responding to insurgents, etc)."

Coming in June 2005

STRONG ANGEL IIII

Reserve your seat, now!

Backup Slides

Collaboration Tool Interoperability

Recommended Guiding Principles

- An end to “pick one kill the rest”
  - Mediation of diverse tools through a lowest common denominator.
- Provide alternatives, not mandates.
  - No single solution to diverse mission reqts.
  - Some overlap is good.
  - Standards in practice are not standard.
  - Let them choose all, some, or none.
- The cream will rise to the top.
  - Target integration, based on usage data.
  - Interoperate at the lowest common denominator.
  - Not everything needs to talk to everything.

Groove Interoperability

- Interoperability with other software suites and data formats supported
  - Web Services Integration
  - Enterprise Data Bridge
  - Collaboration System Integration
  - API Integration (Example: MS Office)

Interoperability:

Microsoft Integration Points (API Integration)

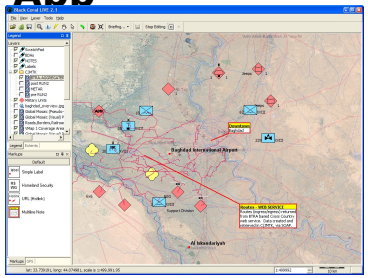
- Microsoft Office
  - Co-Edit Word documents, regardless of Word release level.
  - Conduct review cycles of a single document or document set. Add documents, select reviewers, track revisions, and return documents to where they originated (e.g., Files Tool, Microsoft SharePoint).
  - Co-Present PowerPoint presentations with team members.
  - Share contacts, calendar entries, and email threads.
- Microsoft SharePoint
  - Provides knowledge workers the unique benefits of offline access to team content, automatic synchronization, and secure collaboration across network boundaries, regardless of network connectivity.
  - Groove Mobile Workspace tool set includes specially designed file, discussion, list, and management tools.
- Microsoft Project
  - Import a Microsoft Project file, export to a new Microsoft Project file, or to stay synchronized with a Microsoft Project file over time.
  - Import tasks, resources, links and estimated completions.

Interoperability
Groove Web Services Integration

Examples:

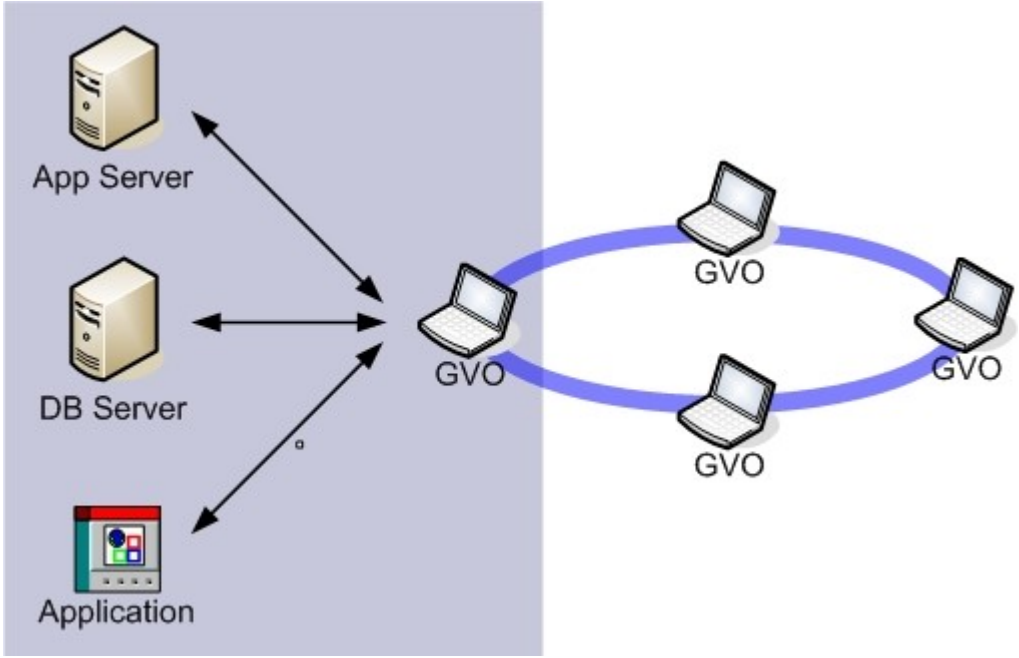
BabylonChat Translingual Service

Oracle DB Publish-Subscribe App



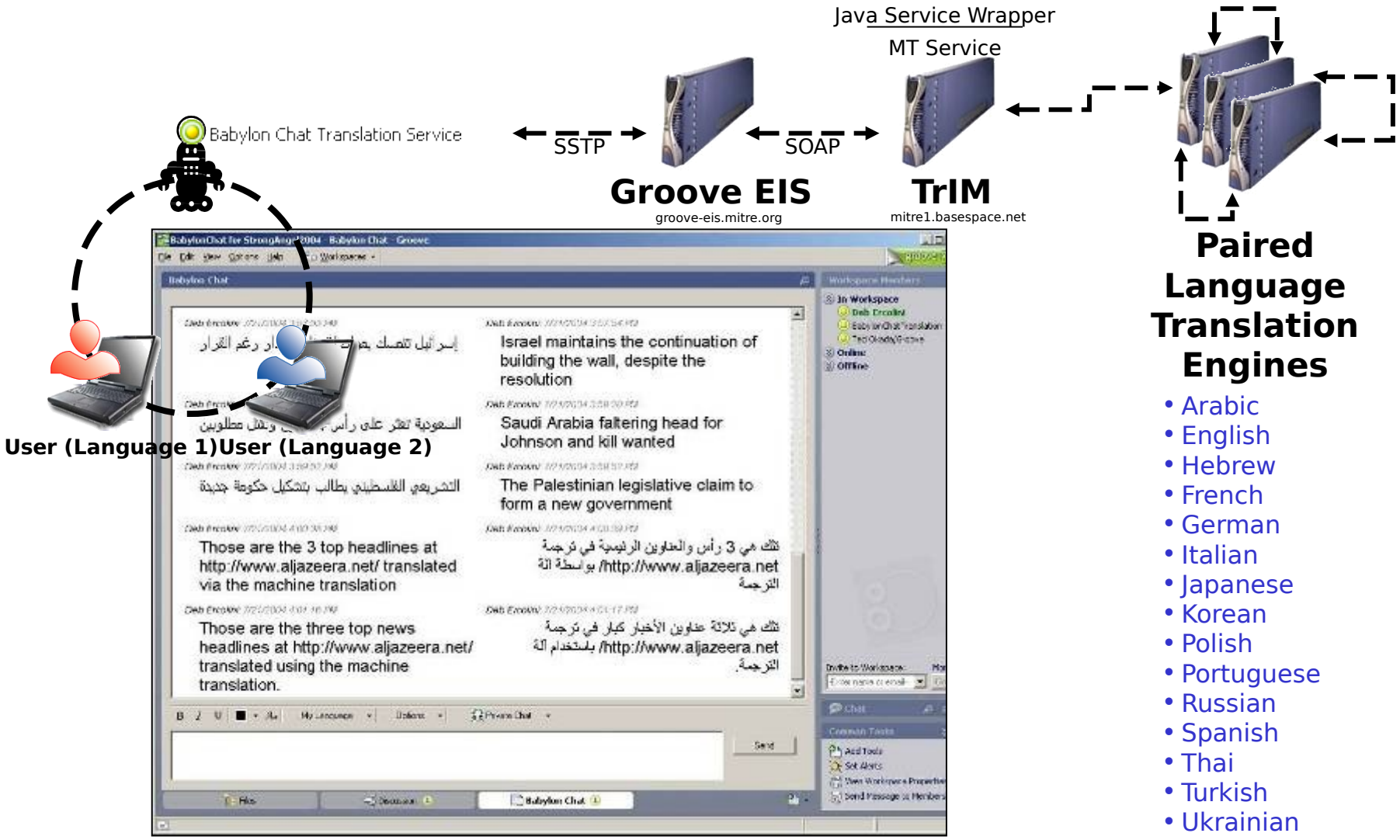
Black Coral LIVE CROP App

- Programmatically exposes Groove collaboration services and/or Groove data in any non-Groove specific application environment or enterprise system/database.
- Provides full create, read, update, and delete methods on all relevant



Babylon Chat:

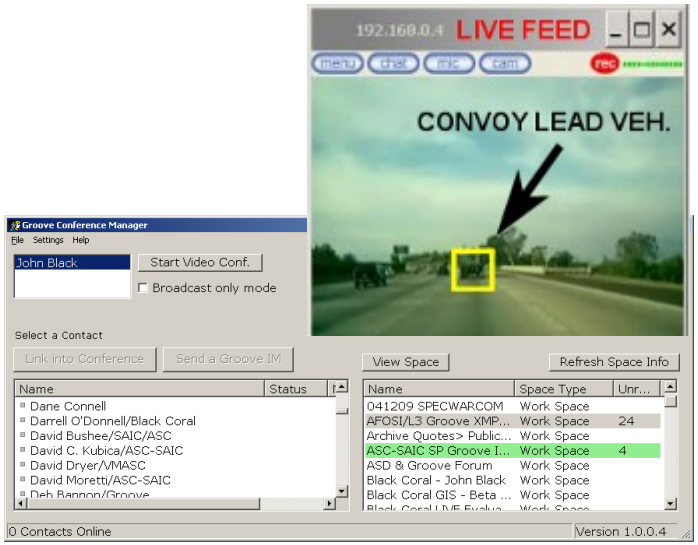
Interoperable, Secure, Multilingual Chat



Interoperability

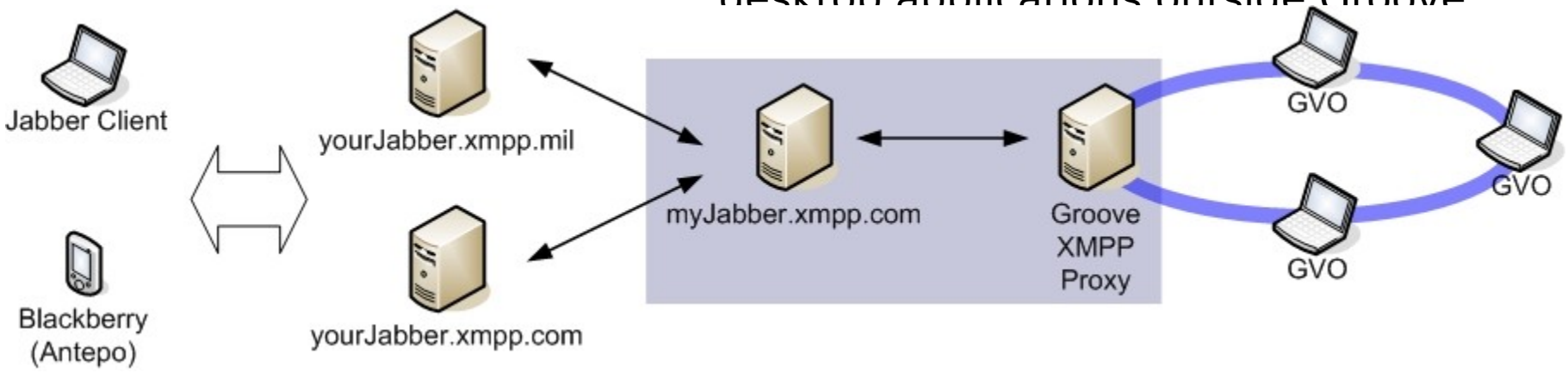
Collaboration System Integration

Examples: **VSee, Jabber**



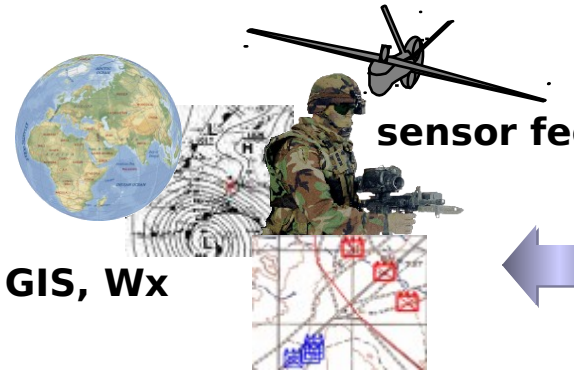
Groove-VSee Conference Manager

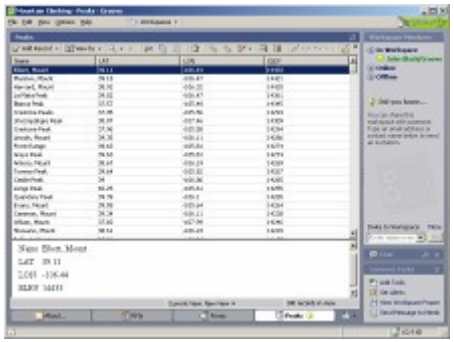
- Groove offers standards-based interoperability with other collaboration system products.
- XMPP provides protocols for instant messaging, presence, and other forms of near-real-time communication based on XML.
- Groove Web Services interfaces allow Groove to integrate with other desktop apps.
- Crypto++ is a FIPS-approved, open source security library, distributed with Groove that can be accessed by desktop applications outside Groove



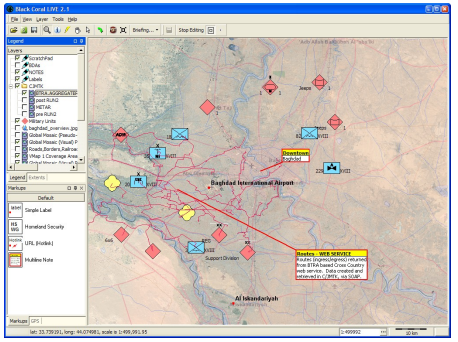
Interoperability: Groove Enterprise Data Bridge

Example: Black Coral GIS Linked to Central Data

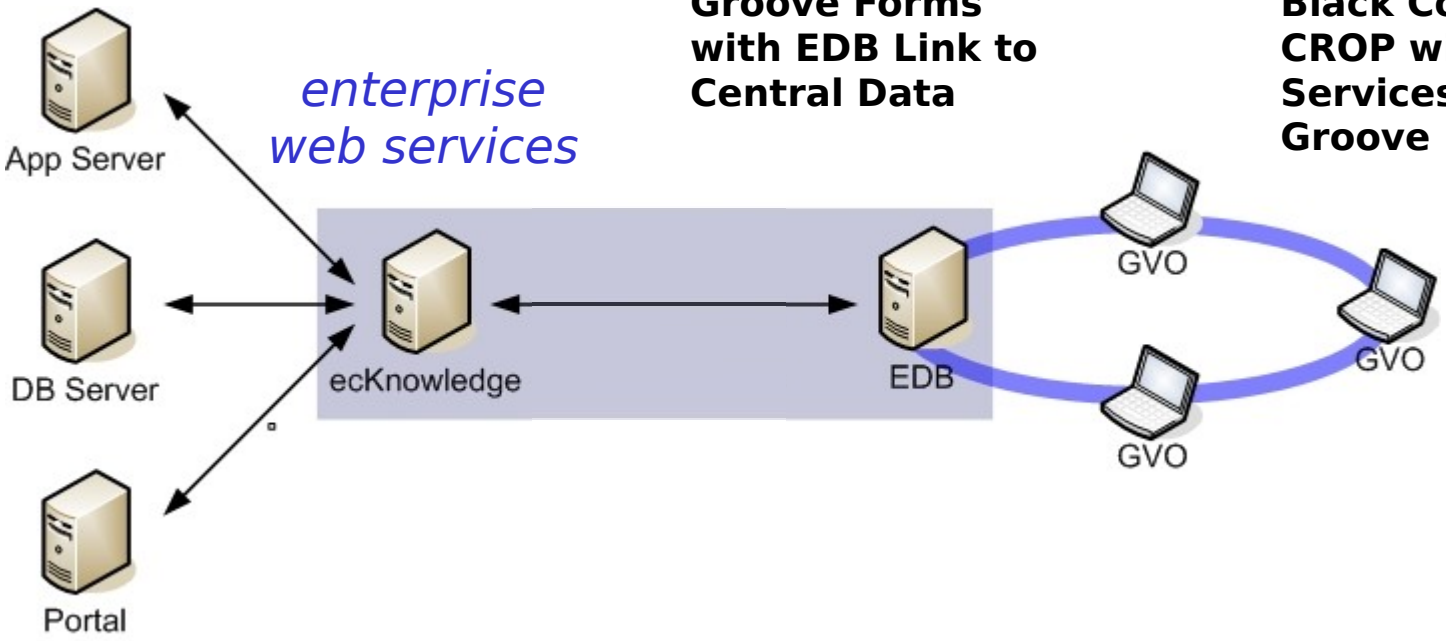




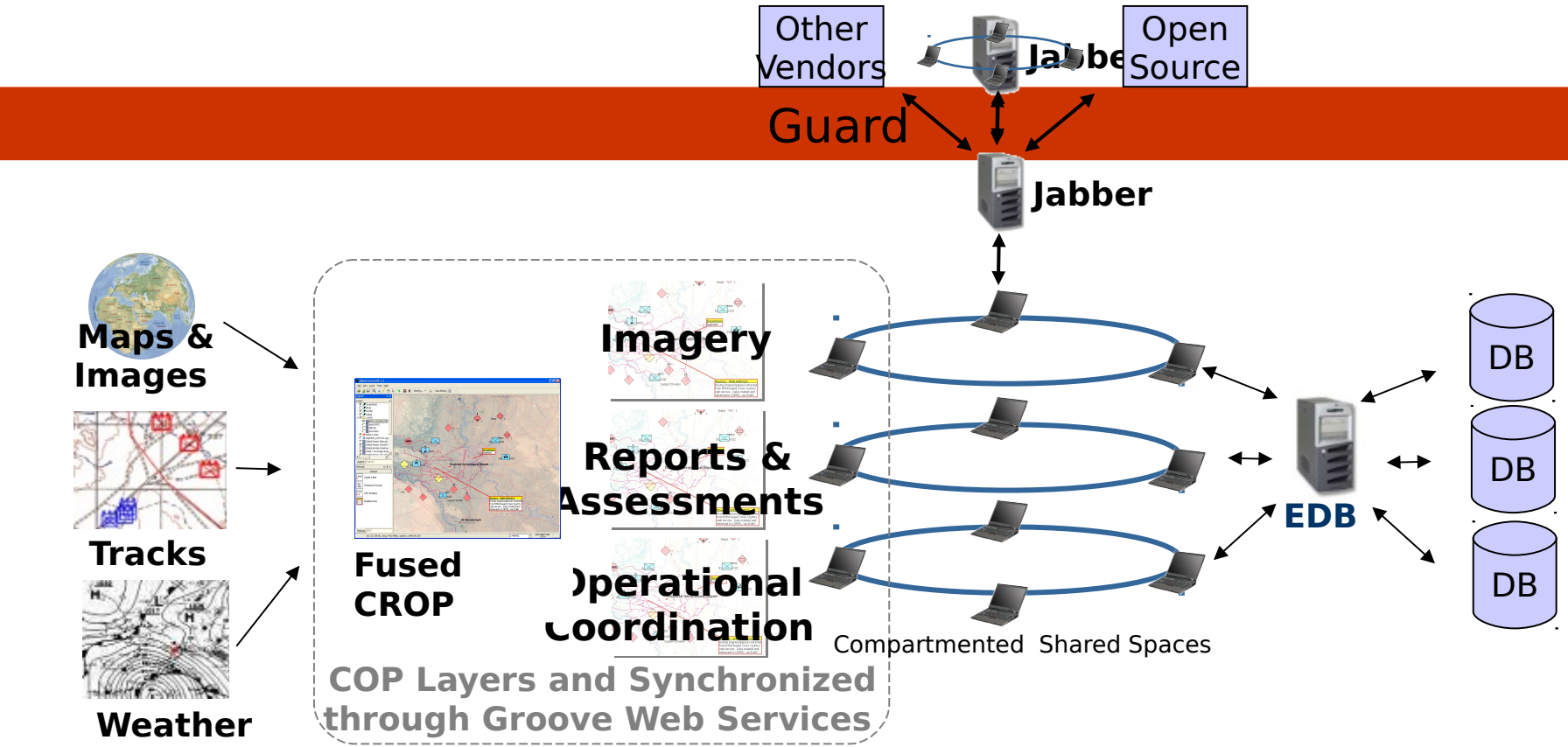
Groove Forms with EDB Link to Central Data



Black Coral CROP with Web Services Link to Groove Forms

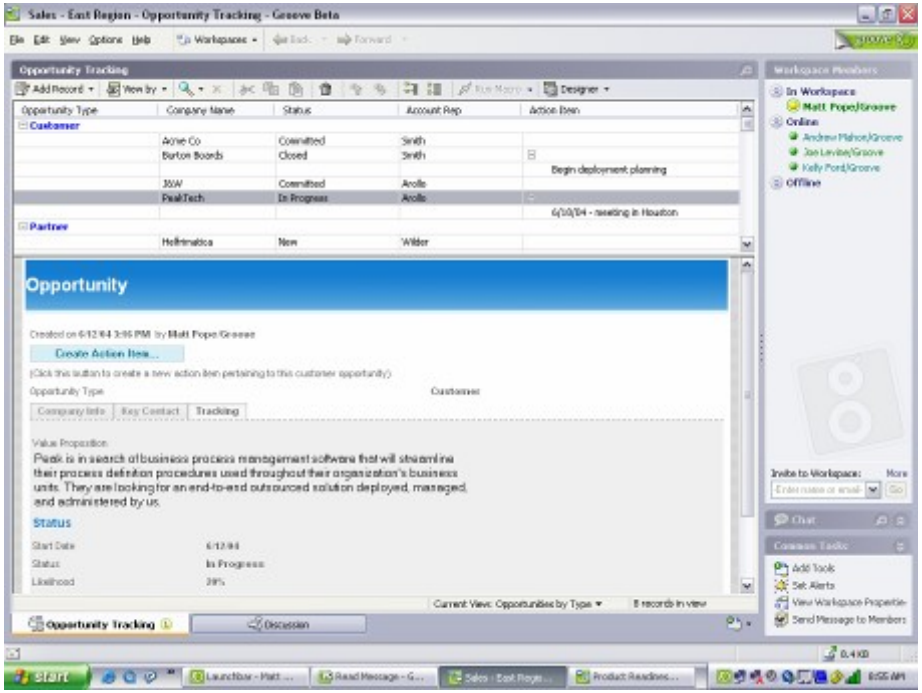


Services Oriented Interoperability



Interoperability:
Rapid Solutions with Groove Forms

- Gathering, sharing, viewing, analyzing and tracking, integrating structured data within and across organizations
- No development skills necessary; “advanced” functionality through scripting
- Build, test, deploy on the order of days and weeks
- Rapid Assessment in Iraq, RFIs, First Responders, Medical Informatics



Interoperability:
Enterprise Data Bridge Overview

- Integration between Groove Virtual Office (Forms) and enterprise databases, ERP, CRM, mainframe, and collaborative systems
  - Extending assets (data) to virtual office workgroups lacking ever-present connectivity to the network,
  - Enabling enterprise data to power critical, user-driven business processes within and across organizations
  - Can handle structure and unstructured data
- Wizard-based definition of data integration jobs
  - No custom integration code required
- Product bundle with CASAHL Inc.’s ecKnowledge
  - CASAHL is the leader in collaborative application integration with enterprise systems with >1,000 enterprise customers

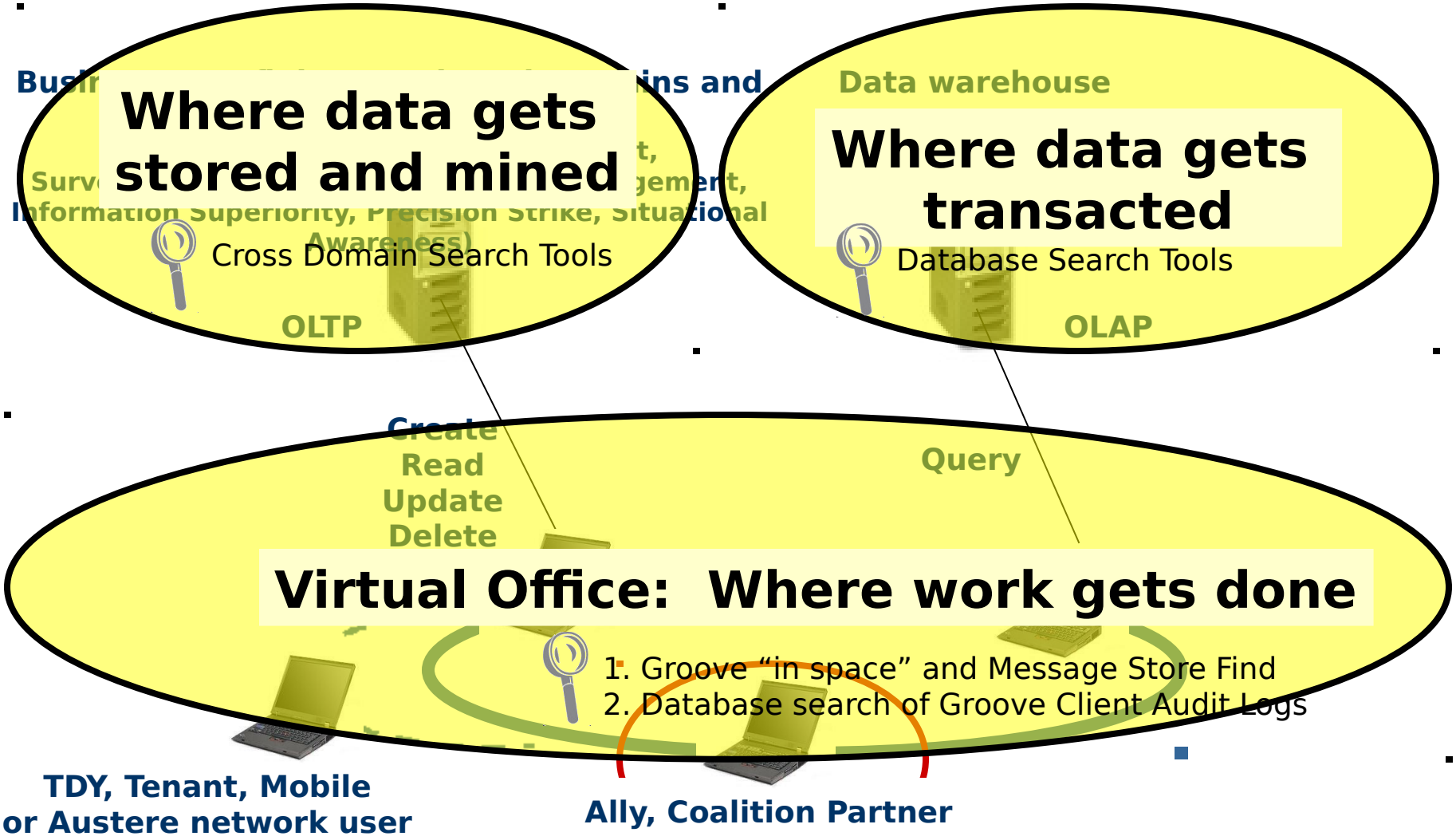
CASAHL

Interoperability:
Enterprise Data Bridge Overview

ecKnowledge connectors

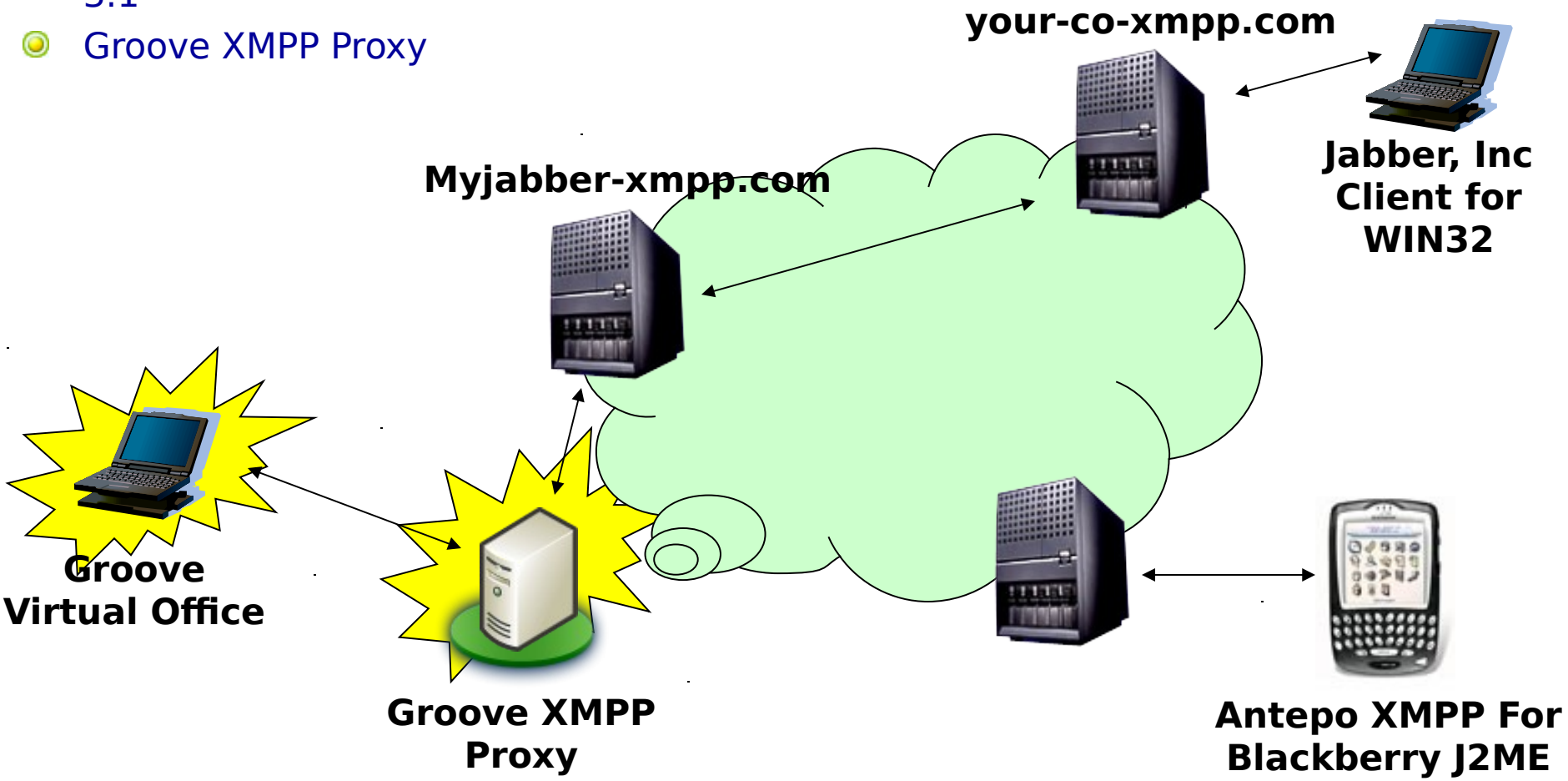
- ODBC
- Oracle native
- SAP R/3
- XML
- Notes/Domino
- Groove
- Sharepoint
- Exchange/Outlook
- Web Services
- FilemakerPro

Interoperability:
EDB: Center and Edge
Data search methodology and technical process



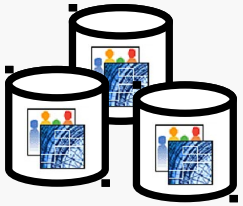
Groove/Jabber Interoperability

- Groove Virtual Office 3.1
- Groove XMPP Proxy



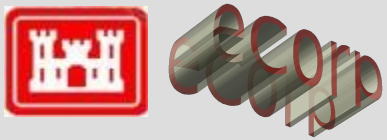
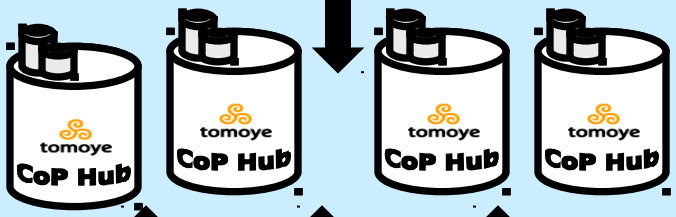
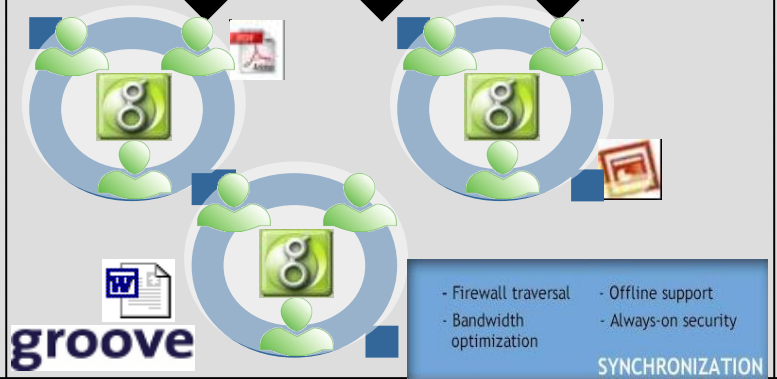
EDB: Center and Edge

Unstructured data/process integration

Usage	Audience	Type/Duration of Content	Interactivity Level	Technology
Store	• Corporate-wide • Internal-only	• Policies & Procedures • Highly Controlled • Scaleable • Searchable • Years	• No interactivity • Information access only • Asynchronous	
Share	• Departmental • Community of practice • Occasional access • Internal-only	• Best practices • Templates • Documentation • Reports • Analyses • Months, Years	• Low interactivity • Primarily information access • Some discussion, Q&A	
Work	• Team • Intensive access • Online *and* offline • Internal *and* external	• Plans • Working drafts • Meetings • Discussions • Business processes Months	• Asynchronous • High interactivity • Decision-making • Content creation • Synchronous *and*	

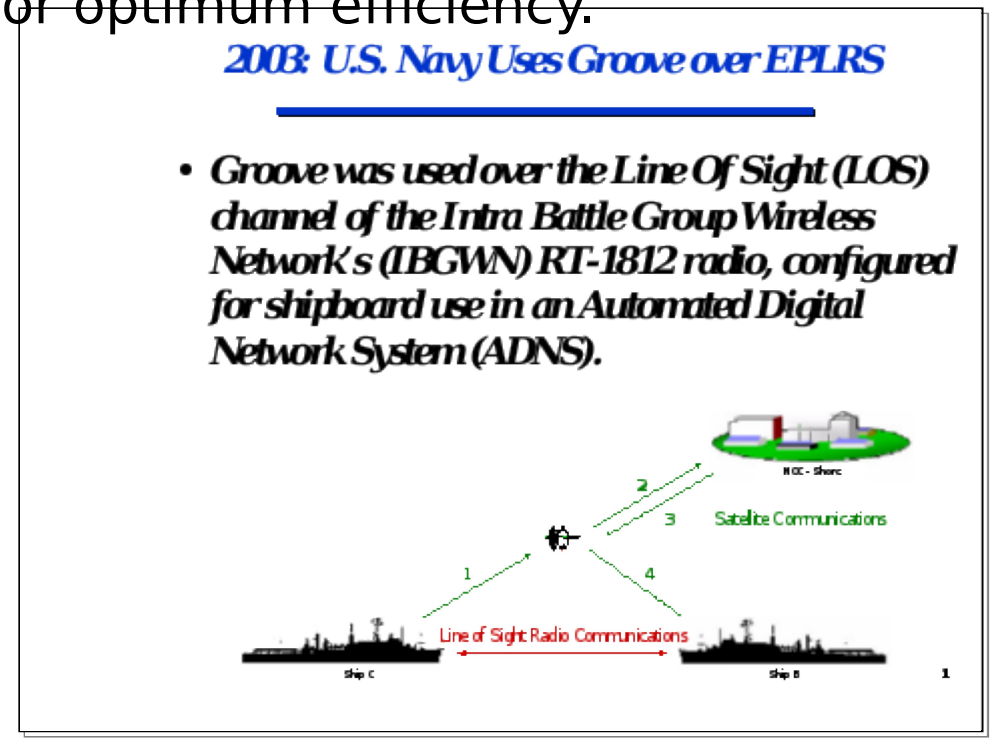
Example Customer Deployment

USACE Knowledge Networking

User	Usage	Data Retention Period / User Base	Concept Representation	Management and Content
USACE Corporate Portal	**Command Level**: USACE Enterprise and Partners	**Years / Thousands**		Highly Controlled, Compartmentalized
Communities of Purpose	**Division and District Level**: Community Repository and Interactive Workspace	**Months to Years / Hundreds**		Project Focused Managed Content, Coordinated knowledge and Information Flow
Virtual Teams	**Knowledge Worker Level**: Task Oriented, Flexible, Secure, Collaborative Workspace	**Days to Months 2 to 30**		Flexible, Dynamic, Open Flow of Information, Creative

Groove Supports Austere Networks

- At some point, everybody wishes they had more bandwidth.
- Groove adapts its behavior to match the amount of available bandwidth for optimum efficiency.
- Groove's asynchronous XML switch architecture is good for supporting users with limited or intermittent connections.
- In testing on EPLRS radio channels, Groove worked with as little as 3.9 Kbs of available bandwidth.



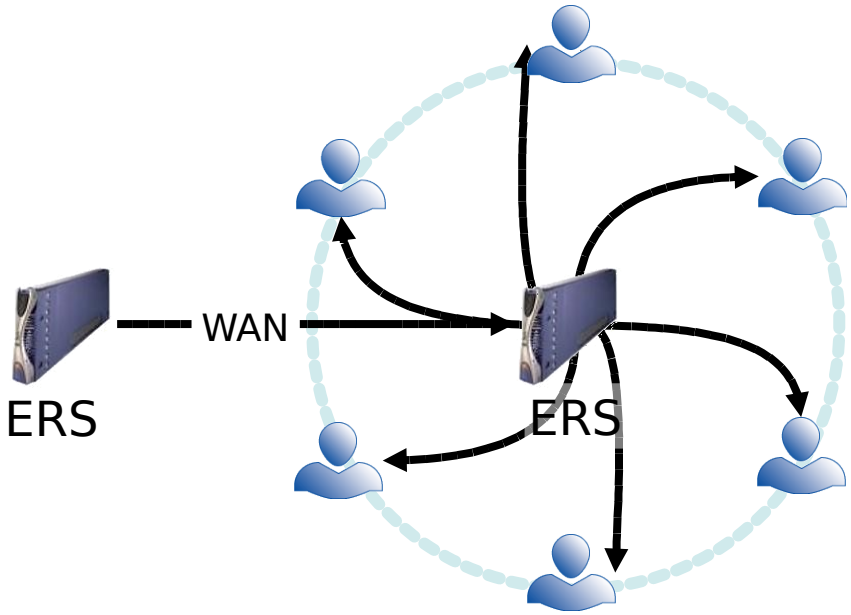
Designed to Conserve Bandwidth

More Bandwidth Optimizations

- Fanout
- Files on Demand
- Groove Communications Panel
- Administrator Control over Bandwidth Allocation

"Typically, the aggregate effect of multiple Groove users on the same local network is the dissipation of local network traffic and minimization of traffic across the WAN."

--DoD Researcher



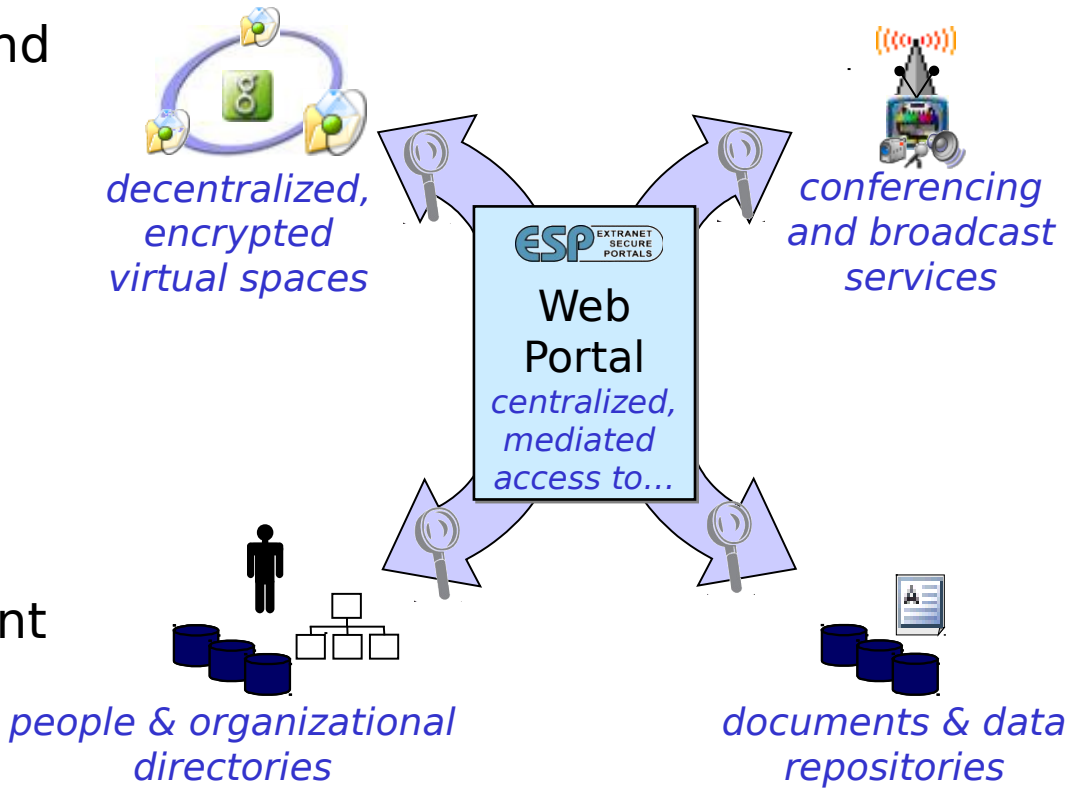
In Fanout the Relay Server multiplexes XML packets, or *deltas* each member in the shared space.

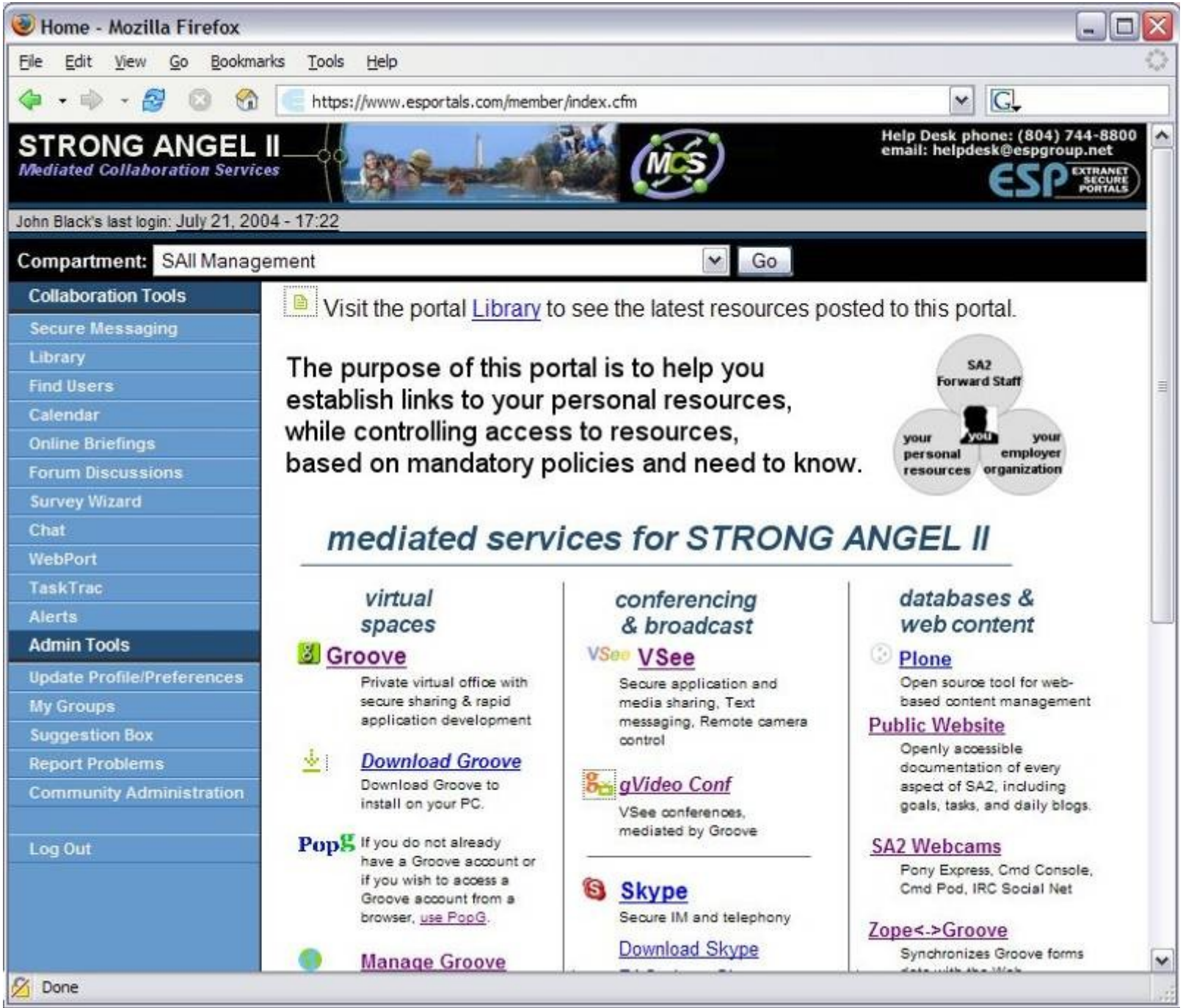
Email/Web/Groove Usage Comparison: Network Traffic of dynamic content

Steps in the Team Document Review Process	User Reads	User Writes	Bandwidth Usage using Email	Bandwidth Usage using Web	Bandwidth Usage using Groove
1. One user creates a 500k document	0	0	0	0	0
2. User sends (or posts) for 10 people	0	1	500k x 1 = 500k	500k x 1 = 500k	500k x 10 = 5,000k
3. Document is read by all 10 people	10	0	500k x 10 = 5,000k	500k x 10 = 5,000k	500k x 0 = zero k
4. 1 person adds 5k of changes & sends	0	1	505k x 1 = 505k	505k x 1 = 505k	5k x 10 = 50k
5. Changes read by all 10 people	10	0	505k x 10 = 5,050 k	505k x 10 = 5,050 k	0 k x 10 = zero k
6. One person adds 10k of changes	0	1	515k x 1 = 515k	515k x 1 = 515k	10k x 10 = 100k
7. Five people read the new document	5	0	515 x 5 = 2,575k	515 x 5 = 2,575k	0 k x 5 = zero k
Total Reads/Writes	**25**	**3**			
Total Data (kilobytes) Over the Wire			**14,145 k**	**14145 k**	**5150 k**

Mediated Collaboration Services

- Groove publishes to portal awareness of and access to persistent spaces.
- Groove uses local and enterprise LDAP directories.
- Groove launches in-context conferencing tools.
- Groove publishes & subscribes to document and data repositories.
- The portal provides centralized, mediated access to Groove & other collaboration services.




Home - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
https://www.esportals.com/member/index.cfm
STRONG ANGEL II
Mediated Collaboration Services
MCS
Help Desk phone: (804) 744-8800
email: helpdesk@espgroup.net
ESP EXTRANET SECURE PORTALS
John Black's last login: July 21, 2004 - 17:22
Compartment: SAII Management
Go
Collaboration Tools
Secure Messaging
Library
Find Users
Calendar
Online Briefings
Forum Discussions
Survey Wizard
Chat
WebPort
TaskTrac
Alerts
Admin Tools
Update Profile/Preferences
My Groups
Suggestion Box
Report Problems
Community Administration
Log Out
Visit the portal Library to see the latest resources posted to this portal.
The purpose of this portal is to help you establish links to your personal resources, while controlling access to resources, based on mandatory policies and need to know.
SA2 Forward Staff
you
your personal resources
your employer organization
mediated services for STRONG ANGEL II
virtual spaces
Groove
Private virtual office with secure sharing & rapid application development
Download Groove
Download Groove to install on your PC.
PopG
If you do not already have a Groove account or if you wish to access a Groove account from a browser, use PopG.
Manage Groove
conferencing & broadcast
VSee VSee
Secure application and media sharing, Text messaging, Remote camera control
gVideo Conf
VSee conferences, mediated by Groove
Skype
Secure IM and telephony
Download Skype
databases & web content
Plone
Open source tool for web-based content management
Public Website
Openly accessible documentation of every aspect of SA2, including goals, tasks, and daily blogs.
SA2 Webcams
Pony Express, Cmd Console, Cmd Pod, IRC Social Net
Zope<->Groove
Synchronizes Groove forms
Done

Tsunami - VEOC - Contents - Groove

File Edit View Format Options Help | Workspaces

Contents

South Asian Tsunami
Virtual Emergency Operations Center

[Browse the Reference Library space]
[Enter the GIS Mapping space]

Help	Technical support, Q&A, FAQs, requests & suggestions
Files	Synchronizing files, co-editing documents, & co-presenting slides
Chat	Chat client (right side of window) using text, ink, & push-to-talk VOIP
Discussion	Threaded discussions on the disaster relief effort
Index	A searchable index of this space, the Library space, & the GIS space.
Contacts	A comprehensive database of subject matter experts
News	Up-to-date news drawn from a variety of sources
SITREPS & Updates	SITREPS & updates selected by a distributed team
News Feeds	Online news aggregators updated hourly
i. Indonesia	Automated news feed on relief efforts in Indonesia
ii. Sri Lanka	Automated news feed on relief efforts in Sri Lanka
iii. India	Automated news feed on relief efforts in India
iv. Thailand	Automated news feed on relief efforts in Thailand
v. Disease	Automated news feed monitoring tsunami-related outbreaks
Web Links	Co-browsing of shared links to web-based resources
Logistics	Suite of applications for managing relief operations

Workspace Members

In Workspace
- John Black/Groove

Online
- Alison Uyeda/PACOM
- Allan Tagayuna/PACOM
- Andy Swarbrick
- Anne Sylvester/PACOM
- APAN/PACOM
- apantech4
- apantech5
- Avis Webster
- Beth Houghton/Groove
- Blair Craig/PACOM
- Bob Feden
- bob jones
- Bob Knuth/General D...
- Brian Fila/CPA
- Carsten - CEG
- Chad Griffin/PACOM
- Charles Perkins/CPA

Offline
- CPT Brad Miller/47th ...
- Dayton Maxwell - ho...
- Deborah Bernsen-Str...
- Delete Michael Helfric...
- Denisa Scott
- Lin Wells/Strong Angel

Invite to Workspace: More
-Enter name or email- Go

Chat

Common Tasks
- Turn Off Tool's Unread Alerts
- Add Tools
- View Workspace Properties
- Invite My Other Computers

C... 1 | Help | Files | Discuss... | Index | Contacts | News | Logistics | Assess... | Backup

2.88 MB

Who in Government is Using Groove?

United States Senate
State Department
JFCOM
US Army
US Navy
US Air Force
US Coast Guard
OSD
DHS
National Guard
Veterans Affairs
DARPA
Mult. Intelligence Agencies
JITF-CT

0peration Iraqi Freedom (sample of

GROOVE FOR RAPID ASSESSMENT IN IRAQ

Army Corps of Engineers
30th Medical Brigade
308th Civil Affairs
352nd Civil Affairs
354th Civil Affairs
402nd Civil Affairs
V Corps

1st Marine Expeditionary Force
1MEF Civil Affairs
1MEF COC
1MEF-3CAG
358th Civil Affairs

Coalition Forces Land Component Command (CFLCC)

CFLCC9

unicef

Office of Reconstruction and Humanitarian Assistance

United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)

Humanitarian Information Unit

USAID

Humanitarian Ops Center (HOC)
DART
Office of US Foreign Disaster Assistance

American Red Cross

DoD User Organizations

- OSD
- JCS
- JFCOM (J9, SJFHQ, JFIC, JWAC)
- EUCOM (Combined Endeavor 05)
- CENTCOM
- PACOM
- DoD Commands Using Groove:
- OSD
- JCS
- JFCOM (J9, SJFHQ, JFIC, JWAC)
- EUCOM (Combined Endeavor 05)
- CENTCOM
- PACOM
- CIFA
- DIA

USAF:

- Air Force Research Labs
- Air Force Experimentation Office
- AFC2ISRC
- PACAF
- ESC-Hanscom
- ESC-Hurlburt

USCG:

- USCG District 7 (JRIES)
- Sector Miami
- USCG District 8
- USCG District 13

Army:

- HQDA
- Forces Command
- Corps of Engineers
- Medical Command
- Training & Doctrine Command
- Space & Missile Defense Command
- Aviation
- Stryker Brigade
- 1st ID
- NETCOM
- CECOM
- Cadet Command
- Civil Affairs

Navy:

- FORCEnet Execution Center
- Naval Postgraduate School
- SPAWAR San Diego
- SPAWAR Chareleston
- SPAWAR EUROPE
- NAVAIR (both PAX River and Lakehurst)
- NAWSC/ACOL (Fallon NAS)
- NAVSEA (NSWC-Carderock)
- Navy eBusiness Office
- ONR
- USNA
- NWDC
- NAVSPECWARCMD
- NAVSPECWARGRU-1

Important: Civil Affairs & MNFI

JCS is drafting ICD for secure chat & web services for coalitions (based on C

Collaboration Technology Lifecycles

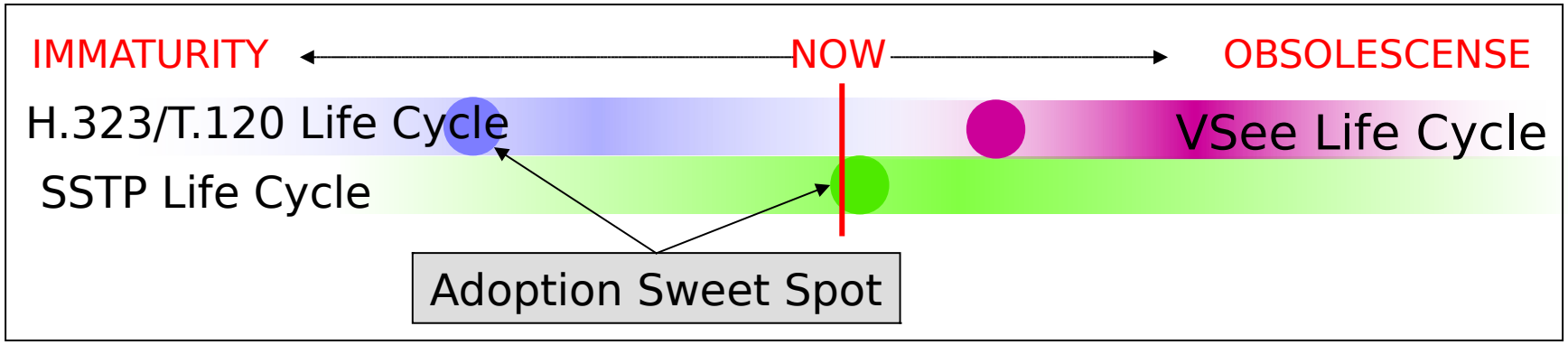
Audioconferencing
Videoconferencing
Remote Desktop Access
Telephone
Presence Detection
Instant Messaging
Whiteboarding
Calendar & Schedule

Centralized Architecture:
H.323/T.120 Conferencing

Design Center

Virtual Workspace
File Sharing
Discussion Forums
Document Management
Project Management

Distributed Architecture:
SMTP: XML-based, encrypted message switch



Knowledge Architecture

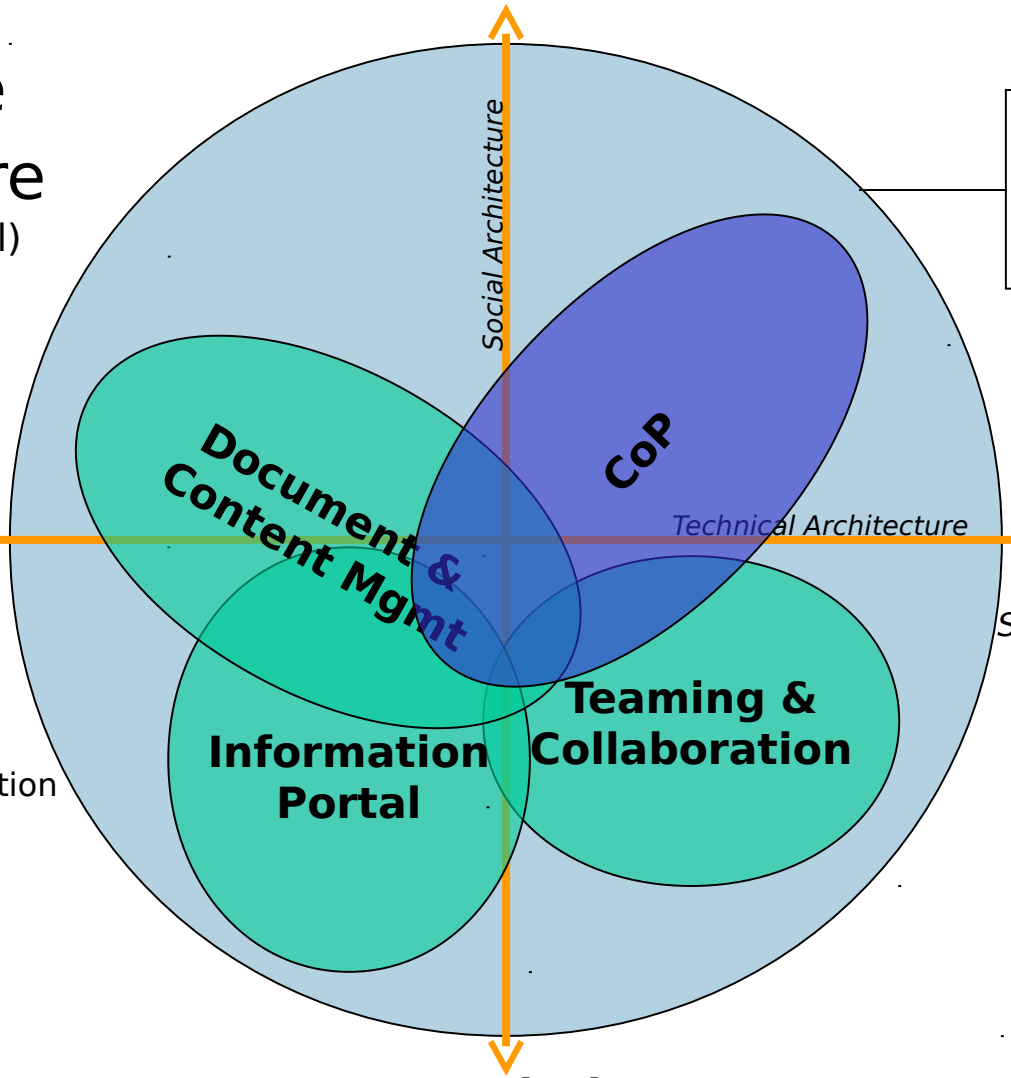
(Social + Technical)

Strategic

Organizationally Aligned

Organizational Agility through Capability Generation

Practice, Learning, Voluntary, Self-governed, Long-term,



Knowledge Management/ Knowledge Portal

Data

Individually Aligned

Access & Manage

Quantity

Automated Context

Complex Workflow

Complex Customization

Interaction

Group Aligned

Steward & Generate

Quality

Social Context

Easy Workflow

Easy Customization

Tactical

Unit & Team Aligned

Mission Accomplishment through Capability Application

Project, Execution, Mandated, Managed, Short-term,

tomoye

Home - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

https://www.esportals.com/member/index.cfm

STRONG ANGEL II

Mediated Collaboration Services

Help Desk phone: (804) 744-8800
email: helpdesk@espgroup.net

ESP EXTRANET SECURE PORTALS

John Black's last login: July 21, 2004 - 17:22

Compartment: SAII Management Go

- **Collaboration Tools**
  - Secure Messaging
  - Library
  - Find Users
  - Calendar
  - Online Briefings
  - Forum Discussions
  - Survey Wizard
  - Chat
  - WebPort
  - TaskTrac
  - Alerts
- **Admin Tools**
  - Update Profile/Preferences
  - My Groups
  - Suggestion Box
  - Report Problems
  - Community Administration
- Log Out

Visit the portal Library to see the latest resources posted to this portal.

The purpose of this portal is to help you establish links to your personal resources, while controlling access to resources, based on mandatory policies and need to know.

mediated services for STRONG ANGEL II

virtual spaces

Groove

Private virtual office with secure sharing & rapid application development

Download Groove

Download Groove to install on your PC.

PopG If you do not already have a Groove account or if you wish to access a Groove account from a browser, use PopG.

Manage Groove

conferencing & broadcast

VSee

Secure application and media sharing, Text messaging, Remote camera control

gVideo Conf

VSee conferences, mediated by Groove

Skype

Secure IM and telephony

Download Skype

databases & web content

Plone

Open source tool for web-based content management

Public Website

Openly accessible documentation of every aspect of SA2, including goals, tasks, and daily blogs.

SA2 Webcams

Pony Express, Cmd Console, Cmd Pod, IRC Social Net

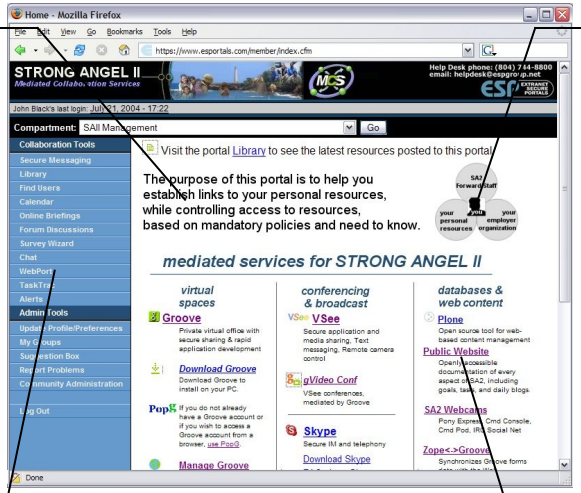
Zope<->Groove

Synchronizes Groove forms

Done

“One Click” Collaboration

New users complete survey for “one click” creation of accounts, whether for an individual, groups, or entire organizations.



Users can be granted administrative rights to their own subordinate compartments to which they can invite guests.

Portal members automatically have access to web-based collaboration tools that work in even the most restrictive security environment.

<u>Services Are Diverse</u>:

Telephony (Trad’l. or IP)

Conferencing

Virtual spaces

Directories & Data

Users choose one, a few, or many services, depending on their need and common capabilities across the workgroup.